

CLAIMS

1. A mesostructured film comprising amphiphilic molecular assemblies and a compound containing as a main component an inorganic material formed on the 5 peripheries of the molecular assemblies regularly arranged three-dimensionally, the mesostructured film being formed on a substrate, wherein:

a local periodic structure in an optional section in parallel with the substrate of the film 10 has a 6-fold axis perpendicular to a film plane; and symmetric reflective surfaces of the structure including the 6-fold axis are facing in the same direction across the entire film.

2. A mesostructured film according to claim 1, 15 wherein the amphiphilic molecular assemblies comprise surfactant micelles containing two or more kinds of surfactants different in structure.

3. A mesostructured film according to claim 2, wherein the two or more kinds of surfactants 20 different in structure comprise nonionic surfactants containing polyethylene oxide as a hydrophilic group.

4. A mesostructured film according to claim 3, wherein the two or more kinds of surfactants different in structure respectively have identical 25 hydrophobic portions and hydrophilic polyethylene oxide portions different in molecular chain length.

5. A mesoporous material film comprising holes

regularly arranged three-dimensionally and an inorganic material as a main component, the mesoporous material film being formed on a substrate, wherein:

- 5 a local periodic structure in an optional section of the film in parallel with the substrate has a 6-fold axis perpendicular to a film plane; and symmetric reflective surfaces of the structure including the 6-fold axis are facing in the same
- 10 direction across the entire film.

6. A production method for a mesostructured film comprising the steps of:

preparing a substrate having an anisotropic surface;

- 15 preparing a reactant solution containing two or more kinds of surfactants and an inorganic material precursor; and

retaining the substrate having an anisotropic surface in the reactant solution.

- 20 7. A production method for a mesostructured film comprising the steps of:

preparing a substrate having an anisotropic surface;

- 25 preparing a reactant solution containing two or more kinds of surfactants and an inorganic material precursor; and

coating the reactant solution on the substrate

having an anisotropic surface.

8. A production method for a mesostructured film comprising the steps of:

preparing a substrate having an anisotropic 5 surface;

preparing a reactant solution containing two or more kinds of surfactants and an inorganic material precursor; and

applying the reactant solution onto the 10 substrate having an anisotropic surface.

9. A production method for a mesostructured film according to claim 7, wherein the reactant solution is applied through a method selected from the group consisting of dip coating, spin coating, 15 and mist coating.

10. A production method for a mesostructured film according to claim 8, wherein the reactant solution is provided through a method selected from the group consisting of soft lithography, an inkjet 20 method, and pen lithography.

11. A production method for a mesostructured film according to claim 6, wherein the surface is made anisotropic through rubbing treatment.

12. A production method for a mesostructured 25 film according to claim 6, wherein the anisotropic surface of the substrate is formed of a Langmuir-Blodgett film of a polymer compound.

13. A production method for a mesoporous material film, comprising the step of removing the surfactants from the mesostructured film according to claim 6, thereby forming pores.

5 14. X-ray optical device comprising the mesostructured film according to claim 1.

15. A structure comprising spherical assemblies of amphiphilic molecules and a compound containing an inorganic material formed on the peripheries of the 10 assemblies, wherein:

the amphiphilic molecular assemblies is regularly arranged across the entire area of the structure; and

15 the arrangement of the amphiphilic molecular assemblies has a 6-fold axis.

16. A production method for a structure comprising spherical assemblies of amphiphilic molecules and a compound containing an inorganic material formed on the peripheries of the assemblies, 20 the production method comprising the steps of:

preparing a substrate having an anisotropic molecular orientation on its surface and a solution containing an inorganic compound and amphiphilic molecules; and

25 retaining the substrate in the solution, and thereby forming the structure on the substrate.